## We claim:

- A process which comprises polymerizing an olefin in the presence of an activator and an organometallic complex, wherein the organometallic complex comprises a Group 3 to 10 transition metal, M, and at least one non-bridged indenoindolyl ligand that is bonded to M wherein the substituent on the indole nitrogen of the indenoindolyl ligand contains an atom selected from the group consisting of S, O, P, and N.
- 2. The process of claim 1 wherein the Group 3 to 10 transition metal is a Group 4 transition metal.
- 3. The process of claim 1 wherein the activator is selected from the group consisting of alumoxanes, alkylaluminum compounds, organoboranes, ionic borates, ionic aluminates, aluminoboronates, and mixtures thereof.
- 4. The process of claim 1 wherein some or all of the activator is premixed with the organometallic complex prior to addition to the support material.
- 5. The process of claim 1 wherein the olefin is selected from the group consisting of ethylene, propylene, 1-butene, 1-pentene, 1-hexene, 1-octene, and mixtures thereof.
- The process of claim 5 wherein the olefin is ethylene in combination with a second olefin selected from the group consisting of 1-butene,1-hexene, and 1-octene.
- 7. The process of claim 1 wherein the substituent on the indole nitrogen contains an ether group.
- **8.** The process of claim **1** wherein the substituent on the indole nitrogen contains a tertiary amine group.
- 9. The process of claim 1 wherein the substituent on the indole nitrogen contains an aromatic ring substituted with an ether group.
- 10. The process of claim 1 wherein the complex is supported on silica.
- 11. The process of claim 1 wherein the polymerization is performed at a temperature within the range of about 30°C to about 100°C.

- 12. A slurry polymerization process of claim 1.
- **13.** A gas-phase polymerization process of claim **1**.
- **14.** The process of claim **1** wherein the indenoindolyl ligand has a structure selected from the group consisting of:

in which  $R_1$  is a  $C_2$ - $C_{30}$  radical containing an atom selected from the group consisting of S, O, P, and N; each  $R_2$  is independently selected from the group consisting of  $C_1$ - $C_{30}$  hydrocarbyl, H, F, Cl, and Br.

**15.** The process of claim **1** wherein the organometallic complex has a structure selected from the group consisting of:

wherein M is a Group 3 to 10 transition metal; each L is independently selected from the group consisting of halide, alkoxy, aryloxy, siloxy, alkylamino, and  $C_1$ - $C_{30}$  hydrocarbyl; L' is selected from the group consisting of alkylamido, substituted or unsubstituted cyclopentadienyl, fluorenyl, indenyl, boraaryl, pyrrolyl, azaborolinyl, and indenoindolyl; x satisfies the valence of M;  $R_1$  is a  $C_2$ - $C_{30}$  radical containing an atom selected from the group consisting of S, O, P, and N; and each  $R_2$  is independently selected from the group consisting of  $C_1$ - $C_{30}$  hydrocarbyl, H, F, Cl, and Br.

- **16.** The process of claim **15** wherein L' is selected from the group consisting of substituted or unsubstituted cyclopentadienyl, fluorenyl, indenyl, and indenoindolyl.
- 17. The process of claim 15 wherein  $R_1$  contains an aromatic ring substituted with an ether group.